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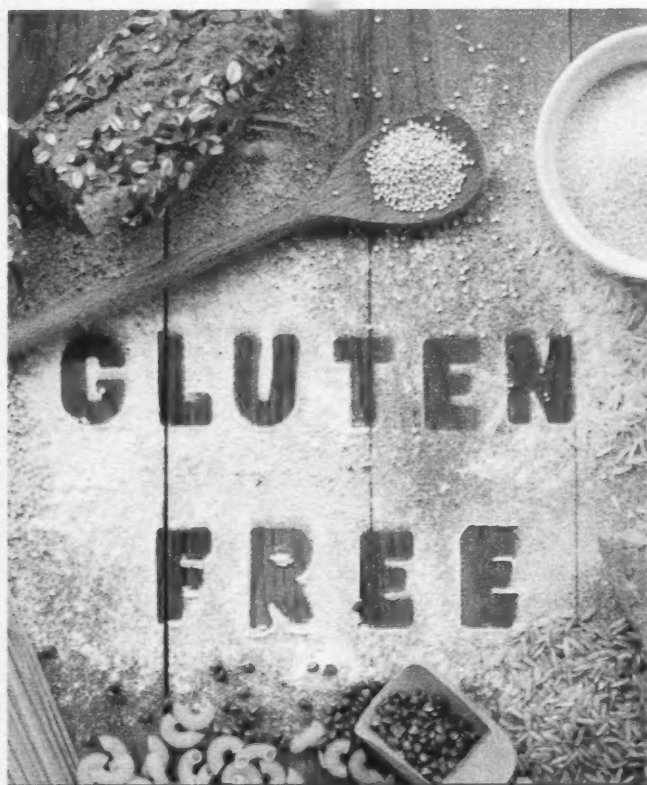
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Celiac disease

The gluten connection



What is celiac disease?

Celiac disease is a chronic immune-mediated intestinal disease in genetically predisposed individuals induced by exposure to dietary gluten proteins that come from wheat, rye, barley and triticale (a cross between wheat and rye). It is a different disease than a food allergy.

In celiac disease, the body's immune system responds abnormally to gluten proteins, resulting in inflammation and damage to the lining of the small intestine, and reduced absorption of iron, calcium and vitamins.

The term gluten includes a broad group of related proteins known as prolamins and glutenins. The prolamins found in wheat (gliadins), rye (secalins) and barley (hordeins) are considered to be of most concern to individuals with celiac disease.

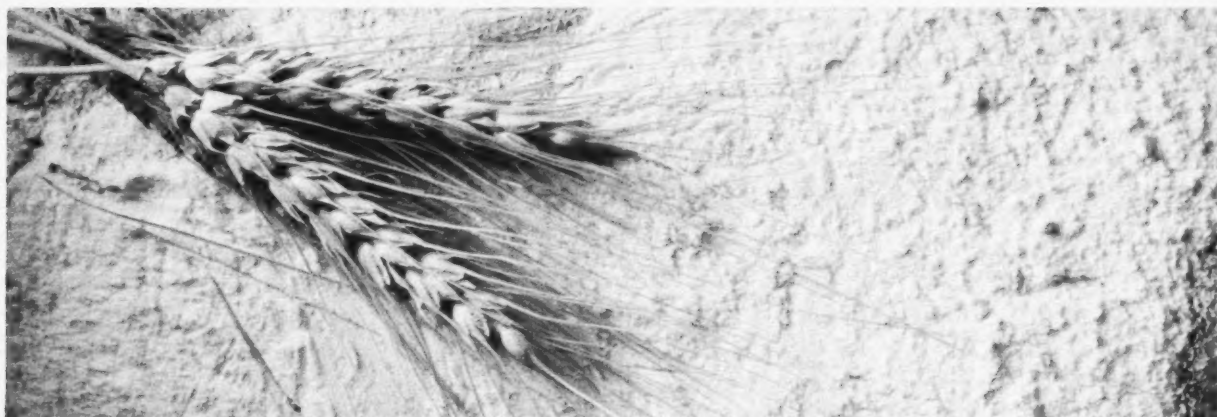
The only current treatment for celiac disease is maintaining a lifelong strict gluten-free diet.

How common is celiac disease?

Celiac disease is relatively common, in both adults and children. It is estimated to affect 0.5–1% the North American population (Kang et al, 2013), though many remain undiagnosed. Celiac disease occurs with increased frequency in relatives of individuals with celiac disease and in individuals with type 1 diabetes, autoimmune thyroid disease, Down syndrome and in people with immunoglobulin A (IgA) deficiency.

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When do the symptoms appear?

The symptoms of celiac disease can develop at any age, once gluten-containing foods are added to the diet. In the past, celiac disease was thought to be a childhood disease, but it is now recognized that it occurs more frequently in adults, especially in individuals between 30 and 60 years of age. A Canadian survey on celiac health reported that the average age of diagnosis in adults was 46 years of age (Cranney et al, 2007).

What are the symptoms?

The symptoms of celiac disease vary greatly in extent and severity. Abdominal pain, diarrhea, bloating and constipation are common gastrointestinal symptoms. Some individuals have no gastrointestinal symptoms but present with fatigue, headaches, difficulty concentration or depression. Others display no obvious symptoms and present with anemia (a low red blood cell count related to iron or folate deficiency) and osteoporosis (decreased bone mass). Children may present with growth impairment or delayed puberty. "Classical" celiac disease in children and adults with the malabsorption syndrome of bloating, diarrhea, fatty stools and weight loss or growth failure is now less frequently encountered because of earlier diagnosis since screening with serological antibodies has become more widely available.

As the disease progresses with continuing exposure to gluten, long-term complications can occur. Many organ systems of the body can be involved, including the gastrointestinal, skeletal, reproductive (infertility) and nervous (ataxia (failure of muscular coordination) and neuropathy) systems. Individuals with untreated celiac disease also have an increased risk of certain cancers.

Is diagnosing celiac disease difficult?

The symptoms of celiac disease are often similar to those of other diseases which can make diagnosis difficult. The Canadian Celiac Health Survey reported that it took approximately 12 years after the onset of symptoms for adults to be diagnosed with celiac disease (Cranney et al, 2007).

Celiac disease can be diagnosed in individuals (while on a diet that contains gluten) through a combination of the following methods:

a. Antibody blood tests:

- IgA-transglutaminase antibody (IgA-tTG)
- IgA-endomysial antibody (IgA-EMA)
- IgG-deamidated gliadin protein (IgG-DGP)

Since people with celiac disease are more likely to be IgA deficient, it is also necessary to measure total IgA in order to avoid false negatives.

- b. Genetic markers (HLA-DQ2 and/or HLA-DQ8) allow exclusion of a diagnosis of celiac disease when they are negative. For example, the markers HLA-DQ2 and HLA-DQ8 are positive in over 99% of individuals with celiac disease but only positive in 40% of the general population.
- c. Small intestine biopsy (tissue sample) is required to confirm the diagnosis of celiac disease.
- d. Recovery from the symptoms while following a gluten-free diet.

Small intestine biopsy remains the 'gold standard' test for confirmation of celiac disease. **Testing for the disease should take place before an individual starts a gluten-free diet since removal of gluten from the diet would interfere with the physician's ability to detect the disease.**

After 6 to 12 months of maintaining a strict gluten-free diet, symptoms should disappear, blood tests for the disease markedly improve and the small intestine begins to heal. It is important for patients with celiac disease to regularly follow up with their family doctor to monitor their progress.

What is the treatment for celiac disease?

The only current treatment for celiac disease is **maintaining a strict gluten-free diet for life.** Complete avoidance of gluten enables the intestine to heal, and the nutritional deficiencies and other symptoms to resolve. Children tend to recover more quickly than adults. Following a strict gluten-free diet also reduces the risk of developing many of the serious long-term complications related to untreated celiac disease. As some of the foods missing in a gluten-free diet are important sources of nutrients like fibre, iron and B vitamins, it is important to follow a dietary pattern that avoids nutritional inadequacy. Therefore, consultation with a dietitian or nutrition specialist is recommended and invaluable.

Adjusting to a gluten-free diet involves a number of lifestyle changes since many commonly eaten foods must be avoided, including pasta, most breakfast cereals and certain snacks, most breads and other baked goods including cakes, cookies, doughnuts, bagels, etc. Wheat flour and wheat starch are also frequently added as a thickener or stabilizer to soups, sauces, and processed meats and fish, including wieners, sausages and imitation seafood. Barley is used in the manufacture of beer and of malt, a flavoring agent commonly used in food. To avoid hidden sources of gluten in the diet, knowledge of potential sources of gluten and careful reading of food ingredient lists are essential. In addition to the gluten-free diet, patients with celiac disease require multivitamin supplements for the first 1-2 years after diagnosis, vitamin D supplementation and adequate calcium intake.



Are there any other gluten-related disorders?

Gluten-related disorders is a term used to describe all conditions related to gluten. These conditions include celiac disease, but also:

- **Wheat allergy**, which occurs when a person's immune system reacts abnormally to wheat proteins; it can be life-threatening. The wheat proteins that can trigger an allergic reaction include gluten proteins (see Health Canada's pamphlet titled *Wheat & Triticale - Priority Food Allergens*: www.canada.ca/en/health-canada/services/food-nutrition/reports-publications/food-safety/wheat-priority-food-allergen.html)
- **Non-celiac gluten (wheat) sensitivity** refers to a spectrum of symptoms caused by the ingestion of gluten proteins or other wheat-related components and occurs in individuals who are not affected with either celiac disease or wheat allergy. Symptoms, which are similar to those seen with celiac disease, typically resolve with the elimination of wheat and other gluten sources. Celiac antibody tests are negative and intestinal biopsies are not diagnostic of celiac disease.
- **Dermatitis herpetiformis** or celiac disease of the skin is characterised by an intensely itchy blistering rash. This disorder is triggered by dietary exposure to gluten and is strongly linked to celiac disease although small intestinal injury is variable in severity.
- **Gluten ataxia** is unsteadiness or incoordination that is associated with positive antibody blood tests with or without small intestinal inflammation. Some of these individuals also have celiac disease.

To avoid unnecessary dietary restrictions, it is important to avoid self-diagnosis.

Newly diagnosed patients should ask their physicians to refer them to a registered dietitian with expertise in celiac disease and the gluten-free diet for dietary counseling and recommended follow-up.



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